

REMARKS/ARGUMENTS

The present Amendment is in response to the Office Action having a mailing date of March 16, 2006. Claims 1-32 are pending in the present Application. Applicant has amended claims 1, 12, 17, 19, 20, 22, 23, 24, 27-29, and 31-32. Applicant has also added claims 33-35. Consequently, claims 1-35 remain pending in the present Application.

Applicant has amended claims 1 and 12 to recite that the third, or return, pole tip is between the write (first) pole tip and the leading end. Support for the amendment may be found, for example, in FIG. 1, items 70 and 63 and paragraph 22. Applicant has also amended claim 12 to clarify the relationship between the write pole tip, the magnetic flux generated, and the medium. Support for the amendment can be found, for example, in the specification, paragraph 30 and in FIG. 3, items 70 and 98. In addition, Applicant has amended claim 12 to recite a specific relationship between the areas of the write and return pole tips. Support for the amendment can be found, for example in paragraph 26 of the specification. Applicant has amended claims 17, 19, 20, 22-23, 27-29 and 31-32 to be in independent form and incorporate the limitations of the base claim and any intervening claims. Applicant has also amended claim 29 to correct a minor error. Claims 17, 19, 20, 22-23 have also been amended to correct the rejection under § 112 of base claim 12. Applicant has amended claim 24 to recite that the return pole tip is at least one micron from the write pole tip. Support for the amendment may be found, for example, in FIG. 1, items 63 and 77 and paragraph 7. Applicant has also added claims 33-35. Support for claims 33-35 can be found, for example, in FIG. 3, items 70 and 80 and arrows 98. Accordingly, Applicant respectfully submits that no new matter is added.

In the above-identified Office Action, the Examiner indicated that claims 17, 19, 20, 22-23, 27-29 and 31-32 would be allowable if rewritten in independent form and to address any rejection of the base claims.

Applicant welcomes the indication that claims 17, 19, 20, 22-23, 27-29, and 31-32 include allowable subject matter. Applicant has amended claims 17, 19, 20, 22-23, 27-29, and 31-32 to be in independent form including the limitations of the base claims and any intervening claims, as well as to overcome the rejection under § 112. Accordingly, Applicant respectfully submits that claims 17, 19, 20, 22-23, 27-29, and 31-32 are allowable as currently presented.

In the above-identified Office Action, the Examiner indicated that reference to the cited patent application was missing and that the title was not descriptive. Applicant has amended the specification to include the serial number and filing date of the cited patent application. In addition, Applicant has amended the title. Accordingly, Applicant respectfully submits that any objections to the specification have been addressed.

In the above-identified Office Action, the Examiner objected to the specification under 37 CFR 1.71 because “the subject matter of Cls. 1-11 is not fully disclosed.” In claim 1, the Examiner cited the recitation of “at least one micron” spacing between the first and third pole tips and the third ferromagnetic layer being “coupled” to the first ferromagnetic layer. The Examiner further noted the recitation in claim 7 of the fourth ferromagnetic layer adjoining the first ferromagnetic layer.

Applicant respectfully traverses the Examiner’s objection to the specification. All of the elements of claims 1-11 are adequately disclosed in the specification. Claim 1 recites a first ferromagnetic layer, a second ferromagnetic layer, and a third ferromagnetic layer. The first ferromagnetic layer is recited as terminating in a first pole tip that is disposed adjacent to the

medium-facing surface of the body. As the Examiner has apparently concluded, this element corresponds to the first ferromagnetic layer 68 that terminates in a first/write pole tip 70. See, FIG. 1, items 68 and 70 and paragraph 21.

The second ferromagnetic layer is “magnetically coupled to the first ferromagnetic layer distal to the medium-facing surface. . .” Moreover, the second ferromagnetic layer terminates “in a second pole tip that is disposed adjacent to the medium-facing surface, between the first pole tip and the trailing end, and spaced from the first pole tip by a nanoscale nonferromagnetic gap . . .” Such a ferromagnetic layer is described in the specification as the second ferromagnetic layer 78 that terminates in a second/deflection pole tip 80. See, FIG. 1, items 78 and 80 and paragraph 21.

The third ferromagnetic layer is recited as “coupled to the first ferromagnetic layer distal to the medium-facing surface and terminating in a third pole tip disposed adjacent to the medium-facing surface and at least one micron from the first pole tip, the third pole tip having a medium -facing area that is at least two orders of magnitude greater than that of the first pole tip, the third pole tip residing between the first pole tip and the leading end . . .” Such a ferromagnetic layer is described in the specification as the *fourth* ferromagnetic layer 89 that terminates in a third/return pole tip. See FIG. 1, items 89 and 63. Furthermore, the specification states:

[a] fourth ferromagnetic layer 89 is magnetically coupled to the other ferromagnetic layers 68, 78, and 88 in the coupling region 65 by a second ferromagnetic stud 81, and terminates adjacent the medium-facing surface 66 *in a third pole tip* 63. The fourth ferromagnetic layer 89 may sometimes be called a return pole layer, and the *third pole tip* 63 *may sometimes be called a return pole tip*.

Specification, paragraph 22. The specification goes on to state that the pole tip 63 “has a medium-facing area that is at least two orders of magnitude greater than that of the first pole tip 70 . . .” Specification, paragraph 26. Thus, the described fourth ferromagnetic layer is coupled to the first ferromagnetic layer by the stud 81, which resides distal to the medium-facing surface. This fourth ferromagnetic layer also terminates in a third pole tip that has a medium-facing area that is at least two orders of magnitude greater than that of the first pole tip. In addition, a pole tip having these characteristics *and* residing at least one micron from the first pole tip is also described in paragraph 7 of the present Application. Consequently, the recited third ferromagnetic layer terminating in a third pole tip having medium-facing area that is at least two orders of magnitude greater than that of the first pole tip and residing at least one micron from the first pole tip is adequately described in the specification. Moreover, Applicant notes that there is no requirement that a number scheme selected in the specification must also be used in the claims. Accordingly, Applicant respectfully submits that claim 1 finds adequate support in the specification.

The limitations of claim 7 are also adequately described in the specification. Claim 7 recites a fourth ferromagnetic layer “adjoining the first ferromagnetic layer and terminating further than the first pole tip from the medium-facing surface.” Such a ferromagnetic layer is described in the specification as the third ferromagnetic layer 88. See FIG. 1 item 88. Moreover, the specification states that the third ferromagnetic layer “adjoins the first ferromagnetic layer 68 but terminates further from the medium-facing surface 66 than the first pole tip 70 . . .” Specification, paragraph 22. Accordingly, Applicant respectfully submits that claim 7 also finds adequate support in the specification. In addition, because the Examiner has no other specific objections to claims 2-6 and 8-11 are adequately disclosed in the specification. Accordingly,

Applicant respectfully submits that the Examiner's objections to the specification have been addressed.

In the above-identified Office Action, the Examiner rejected claims 1-11 under 35 U.S.C. § 112, first paragraph, as directed to subject matter which was not described in the specification in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention.

Applicant respectfully traverses the Examiner's rejection. First, second, third, and fourth ferromagnetic layers are disclosed in the specification and can be considered to correspond to the first, second, fourth, and third ferromagnetic layers, respectively, recited in claims 1-11. See, for example, items 68, 70, 78, 88, and 89 in FIG. 1 and paragraphs 7, 21, and 22. Accordingly, Applicant respectfully submits that claims 1-11 are allowable under 35 U.S.C. § 112, first paragraph.

In the above-identified Office Action, the Examiner also objected to the drawings as not showing each feature of Claim 1. As described above, the features of claim 1 (as well as claims 2-11) are shown in the drawings. See, for example, FIG. 1, items 68, 70, 78, 80, 88, 89, and 63. Accordingly, Applicant respectfully submits that no correction to the drawings is needed.

In the above-identified Office Action, the Examiner rejected claims 1-11 under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular the Examiner cited the clause "wherein the magnetic flux traversing the write pole tip has a maximum strength in the media layer at a location that is closer than the write pole tip to the trailing end. . ." recited in claim 12.

Applicant respectfully traverses the Examiner's rejection. Claim 12 currently recites "wherein the magnetic flux traversing the write pole tip has a maximum strength in the media layer at a distance from the write pole tip that is less than a spacing between the write pole tip and the trailing end." One embodiment of such a structure is depicted in FIG. 3. See, for example, FIG. 3 items 70 and 98 and paragraph 30. Accordingly, Applicant respectfully submits that claims 12-23 are clear and definite.

In the above-identified Office Action, the Examiner rejected claims 12, 13, 18, and 21 under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 6,954,340 (Shukh). In so doing, the Examiner referenced FIG. 14 of Shukh. The Examiner analogized item 42 as the recited return pole, item 51 as the recited write pole, item 52 as the recited deflection pole, and item 53 as the recited nanoscale gap.

Applicant respectfully traverses the Examiner's rejection. Claim 12 recites a magnetic head including a body having a leading end and a trailing end. Claim 12 recites a first ferromagnetic loop terminating in a write pole tip and a return pole tip that are disposed adjacent to the medium-facing surface, separated from each other by more than one micron, and in which the return pole tip has an area that is at least two orders of magnitude greater than that of the write pole tip. Claim 12 also recites that the return pole tip resides between the write pole tip and the leading end. In addition, claim 12 recites a second magnetic loop terminating in the write pole tip and a deflection pole tip that is disposed adjacent to the medium-facing surface between the write pole tip and the trailing end. Claim 12 also recites that the magnetic flux traversing the write pole tip has a maximum strength in the media layer at a distance from the write pole tip that is less than a spacing between the write pole tip and the trailing end.

Shukh does describe a system having a leading pole 42 that also serves as a shield, a write pole 51 and another pole 52. Shukh, col. 6, lines 10-52. However, in Shukh's discussion of the head depicted in FIG. 14 of Shukh, Applicant can find no mention of any particular relationship between the area of the write pole tip and that of the return pole tip. More specifically, Shukh fails to teach or suggest a return pole tip having a medium facing area at least two orders of magnitude greater than that of the write pole tip. Similarly, Applicant has found no mention in Shukh of any relationship between the distance between the write pole tip and the maximum strength of the magnetic flux and the spacing between the write pole tip and the trailing end. Thus, Shukh fails to teach or suggest a head configured such that the magnetic flux traversing the write pole tip has a maximum strength in the media layer at a distance from the write pole tip that is less than a spacing between the write pole tip and the trailing end. Shukh, therefore, fails to teach or suggest the head recited in claim 12.

Claims 13, 18, and 21 depend upon independent claim 12. Consequently, the arguments herein apply with full force to claims 13, 18, and 21. Accordingly, Applicant respectfully submits that claims 12, 13, 18, and 21 are allowable over the cited references.

Claims 13 and 18 are also separately allowable over the cited references. Claims 13 and 18 recite specific angles for the magnetic flux emanating from the trailing corner. Applicant has found no mention in Shukh of such specific angles for the magnetic flux from the trailing corner of the write pole tip. Consequently, claims 13 and 18 are separately allowable over the cited references.

In the above-identified Office Action, the Examiner also rejected claims 12-16, 18, 21, 24-26, and 30 under 35 U.S.C. § 102 as being anticipated by U.S. Patent No. 6,720,972 (Mochizuki). In so doing, the Examiner cited FIG. 10 of Mochizuki.

Applicant respectfully traverses the Examiner's rejection. Claims 12 and 24 recite heads including a body having a leading end, a trailing end and a medium-facing surface. Both claims 12 and 24 recite return pole tips adjacent to the medium-facing surface, having an area at least two orders of magnitude greater than that of the write pole tip, and spaced apart from the write pole tip by at least one micron. Claims 12 and 24 also recite deflection pole tips separated from the write pole tip by a submicron nonferromagnetic gap.

Mochizuki describes a structure having a main pole tip and two auxiliary poles. Mochizuki, FIG. 10 items 1, 3a, and 3b. In the head described by Mochizuki, the thickness of the leading auxiliary pole 3a is less than the thickness of the trailing auxiliary pole 3b. Mochizuki, col. 7, lines 9-12. In addition, the relationship between the areas of the auxiliary poles is indicated. Mochizuki, col. 6, lines 63-66. However, Applicant has found no indication in Mochizuki that the area of one particular one of the auxiliary poles is two orders of magnitude greater than that of the main pole. Consequently, Mochizuki fails to teach or suggest the heads recited in claims 12 and 24. Accordingly, Applicant respectfully submits that claims 12 and 24 are allowable over the cited references.

Claims 13-16, 18, and 21 depend upon independent claim 12. Claim 25-26, and 30 depend upon independent claim 24. Consequently, claims 13-16, 18, 21, 25-26, and 30 are allowable over the cited references.

Claims 18 and 26 are also separately allowable over the cited references. Claims 18 and 26 recite specific angles for the magnetic flux emanating from the trailing corner. Applicant has found no mention in Mochizuki of such specific angles for the magnetic flux from the trailing corner of the write pole tip. Consequently, claims 18 and 26 are separately allowable over the cited references.

The citation by the Examiner of U.S. Patent No. 6,791,976 (Shukh II) and U.S. patent No. 7,009,812 (Hsu) do not change the above conclusion. Applicant has found no mention in Shukh II or Hsu of heads including the combination of elements recited in claims 12-16, 18, 21, 24-26, and 30. Accordingly, Applicant respectfully submits that claims 12-16, 18, 21, 24-26, and 30 are allowable over the cited references.

New claims 33-35 depend upon independent claims 1, 12, and 24, respectively. Consequently, the arguments herein apply with full force to claims 33-35. Accordingly, Applicant respectfully submits that claims 33-35 are allowable over the cited references.

Applicant's attorney believes that this application is in condition for allowance. Should any unresolved issues remain, Examiner is invited to call Applicant's attorney at the telephone number indicated below.

Respectfully submitted,

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